DOCUMENT RESUME

ED 279 700 TM 870 087

AUTHOR Sticht, Thomas G.
TITLE Issues in Indexing Functional Literacy.
PUB DATE 27 Feb 87
NOTE 20p.; One of 46 papers commissioned by the Study Group on the National Assessment of Student Achievement and cited in Appendix B to their final report "The Nation's Report Card" (TM 870 049). For other papers in this group, see TM 870 050-094.
PUB TYPE Viewpoints (120)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Academic Achievement; Academic Aptitude; Adult Literacy; *Basic Skills; *Educational Assessment; *Educational Diagnosis; Elementary Secondary Education; *Functional Literacy; *Knowledge Level; Measurement Objectives; Measurement Techniques; Predictive Validity; Test Bias; *Testing Problems
IDENTIFIERS *National Assessment of Educational Progress

ABSTRACT

This paper explores some of the issues involved in developing an index of functional literacy that can serve diagnostic purposes. In 1985, Secretary of Education William J. Bennett outlined principles for the National Assessment of Educational Progress (NAEP), including a principle calling for NAEP to "develop an index of functional literacy that is consistent over time and applicable to the adult population as well as to children of school age." Two major issues must be dealt with in indexing functional literacy: (1) the nature of literacy; and (2) societal demands for literacy. The issue of literacy as knowledge, skill, and information processing with the written language and other graphic tools of thought and communication underlies many of the problems in the assessment of literacy and functional literacy. Presently, neither NAEP nor any other assessment conceptualizes these different aspects of cognition and uses them for designing tests to reveal contributions of these different facets of ability to the performance of literacy tasks. The determination of the demands of society produces the major controversies surrounding the assessment of literacy. It is difficult to develop an index of functional literacy that can be used diagnostically with precision. (LMO)

Issues in Indexing Functional Literacy

Thomas G. Sticht

Applied Behavioral & Cognitive Sciences, Inc.
San Diego, CA

Paper commissioned by

THE STUDY GROUP ON THE NATIONAL ASSESSMENT OF STUDENT ACHIEVEMENT

1986

This is a paper prepared for a task force on educational assessment formed in 1985 by Secretary of Education, W. Bennett. (Date of this draft: 2/27/87)

ISSUES IN INDEXING FUNCTIONAL LITERACY

Thomas G. Sticht
Applied Behavioral & Cognitive Sciences, Inc.
San Diego, CA 92106

In a speech of September 18, 1985, Secretary of Education, William J. Bennett outlined seven principles that would guide the U.S. Department of Education as it developed plans for the future of the National Assessment of Educational Progress (NAEP). It is the fourth principle that is the subject of the present paper. That principle states:

> NAEP should develop an index of "functional literacy" that is consistent over time and applicable to the adult population as well as to children of school age. NAEP should then employ a fixed schedule (once every decade, perhaps, like the Census) by which it uses this index to assess literacy and illiteracy in the nation as a whole.

At the end of his speech, Secretary Bennett states that, "Fundamentally, we all use assessment-type data for diagnostic purposes, so that we can know how we are doing, where we are succeeding up to our aspirations and where we are falling short, in order to strengthen our ability to provide every child with an opportunity to achieve educational excellence."

This paper explores some of the issues involved in developing an index of functional literacy that can serve diagnostic purposes like those addressed by Secretary Bennett. Previous discussions of the concept of functional literacy and its assessment have been given by Northcutt, et al (1973), Bormuth (1975), Rosnick

and Resnick (1977), Kirsch and Guthrie (1977/73), Fisher (1978), Hunter and Harmon (1979), Levine (1982), Cervero (1985), Stedman and Kaestle (1986), Valentine (1986), and Kirsch and Jungeblut (1986). While these and other papers have been reviewed in preparing to write this report, limitations of time do not permit me to comment on each of the earlier works, nor to incorporate all of the important points made by the authors of these earlier works. They are noted here so that readers of this paper may seek them out for further study.

There are a number of important issues not considered in this paper that are involved in any national assessment, such as the representativeness of the sample used to extrapolate findings to the population, the adequacy of the data processing, analysis, and reporting, and the general limitations of psychometric methods for scaling and indexing any human "trait" or "ability," including basic measurement theory, unit of analysis and other scaling problems, generalizability questions and so forth. All of these are important matters for educational achievement, but they are not unique to literacy assessment and so they are not dealt with here.

Here I will limit discussion to what I think are basic issues in the assessment and indexing of functional literacy. I will not discuss issues that I think are so well understood today that they do not need further discussion. This includes problems in using years of education to indicate levels of literacy. It is so well recognized now that even possession of a high school diploma does not guarantee a high level of achievement in literacy that it is not worth a protracted discussion here.

Nor will I comment on the problems of using with adults standardized reading

tests normed on grade school children and scored in reading grade level units. Elsewhere I have shown that, apart from the poor psychometric properties of reading grade level scales (e.g., lack of interval scaling), adults who score at, say, the 5th grade level on a standardized reading test may not be as competent as typical 5th grade students in other literacy tasks. Hence, the basic meaning of a reading grade level score, that is, that the examinee who gets a given score has the skill of the norming group at that score does not necessarily hold for adults taking tests normed on school children (Sticht, 1982; see also Stedman and Kaestle, 1986, Appendix C).

Another issue that I will not dwell on concerns the sociopolitical differences among individuals and groups that prevent unanimity regarding the development and utilization of any type of test or index of functional literacy. There are some who reject the concept of national human resources management policies and any attempts by the federal (or any other) level of government to "diagnose" educational problems and to direct, guide, or even inform efforts to see if "we" are reaching "our" aspirations. For instance, Hunter and Harmon (1979) have argued that each person ought to select his or her own literacy goals. They defined functional literacy as ". . . the possession of skills perceived as necessary by particular persons and groups to fulfill their own self-determined objectives . . . the ability to read and write adequately to satisfy the requirements they set for themselves as being important for their own lives . . . (p. 7)" (underlining for emphasis is in original text).

But even Hunter and Harmon must have recognized the limitations to self-determination of literacy goals by individuals when, in the very next phrase, they state that functional literates should possess ". . . the ability to deal positively with demands made on them by society . . . (p. 7.)" Since society and not the individual determines societal demands for literacy, self-determination of literacy goals is not a feasible concept in contemporary society. We have recognized this by passing compulsory education laws in all states for children. Children do not get to self-determine when, what, how,or why they learn literacy skills and the knowledge it takes to make the literacy skills worthwhile. A question that has not been debated is whether or not illiterate or functionally illiterate adults ought to face compulsory education. But this is a hornet's nest that I will not disturb here.

THE NATURE OF LITERACY

There are two major issues that must be dealt with in indexing functional literacy. One of these concerns the nature of literacy; just what do we mean by that word? The second major issue relates to Hunter and Harmon's assertion that functional literates should possess the ability to deal positively with demands made on them by society. The question is, what are the demands for literacy that society makes, and on whom?

What is Literacy? The recent paper by Stedman and Kaestle (1986) illustrates the problems of understanding what is meant by the word "literacy."

Several quotes make the main point:

> "Nevertheless, of the five tests, the Adult Performance Level was particularly subject to the problem of bias because it was designed to test knowledge as well as skills" (p. 38).
>
> (regarding another test) "Bias was probably less a problem since these tests were focused on functional skills rather than knowledge. Tests that involve telephone dialing instructions, application forms, and everyday reading such as train schedules, store coupons, and report cards are less prone to cultural prejudice." (pp. 39-40)
>
> (in critiquing Donald Fisher's information processing model and analysis of the errors of people on ETS's Adult Functional Reading Study) "his model describes a dynamic information processing system that cannot be clearly distinguished from functional literacy." (p. 42) "But college-educated individuals, having had extensive test experience, likely recognized most test construction errors and realized what the tester "had in mind." The errors they made on the test were more likely to have been real functional errors." (p. 43)

Here, then, is a critical issue: what is the relationship of knowledge to literacy skill? Stedman and Kaestle seem to believe that there are "skills" that do not require knowledge for their execution. According to them, testing "knowledge" introduces opportunities for "bias" that are not there or are at least greatly reduced if testing is restricted to "skills." Somehow, for them, reading telephone dialing instructions tests "functional skills rather than knowledge." Yet, how one could read and comprehend telephone dialing instructions without possessing knowledge of the meaning of such words as "telephone," "dialing," and so forth is unclear to me.

There is a wide-spread belief in knowledge-independent literacy skills that make the notion of "functional literacy" compelling to some. This idea is captured by educators in the saying that "First the child learns to read, and then he reads to learn." Similarly, the idea that "literacy is the key tool for acquiring knowledge"

leaves the impression that literacy is something one first gets and then uses to acquire knowledge.

In the NAEP, the conceptual separation of literacy from knowledge is clearly indicated by the existence of tests of reading and writing skills, and separate tests for "content," such as mathematics, science, etc. Of course, all of the latter "content" tests are given in written language that require reading "skill," just like the reading tests do. And if one studies the reading "skill" tests, one finds all sorts of specific "knowledge" called for, such as knowing the meaning of the vocabulary word "horsepower."

I will not attempt to resolve the knowledge/process issue here, but I will note that it is important to understand the role of knowledge as the key tool by means of which literacy is acquired. Developmentally, children first acquire knowledge, including knowledge of the oral language. They then draw on their knowledge of the world and the oral language to learn to read and write. Then they use their new literacy abilities to acquire new knowledge, including content knowledge and knowledge of a wide range of literacy tools such as graphs, flow charts, procedural charts, lists, etc. that do not exist in the spoken language. Assessment approaches might be developed that take account of the fact that knowledge can be assessed without imposing the requirements for reading, by use of oral language and pictures (including TV). Then, if one is interested in the extent to which graphic tools of thought and communication can be used to represent knowledge already known to be possessed,or to acquire knowledge known to be not possessed,

appropriate tests could be developed. By establishing in a literacy-free manner what knowledge people have, and then assessing their ability to communicate that knowledge using graphic symbol systems, one avoids the issue of "bias" as expressed by Stedman and Kaestle, above.

Functional Literacy. The interrelationship of knowledge and skill in our thinking about literacy shows itself when we speak of "civics literacy," "technological literacy," "science literacy," "computer literacy," etc. as though literacy has to do with a body of knowledge. By this way of thinking, one could be a science or computer illiterate, while being technologically, historically, civically, culturally, etc. literate.

When not thought of as a level of skill, such as the 5th grade level discussed above, "functional literacy" is frequently thought of like the various content domain literacies except that it has to do with different domains. For instance, in the APL study, functional literacy was assessed in the knowledge domains of consumer economics, occupational knowledge, etc. In the most recent NAEP for young adults, the domains were defined not in terms of content, but rather in terms of types of materials: prose, documents, and quantitative. In the latter case, content knowledge in mathematics was also involved in defining the domain. Within each of these three domains, then, people were not tested for possession of the semantic content of the materials, but rather in terms of the types of information processing involved.

Functional literacy is most usually thought of as the domain of literacy in the

"real world" outside of the school or academic setting. The concern for functional literacy is frequently expressed in terms of whether or not the schools are producing "products" who can meet the literacy demands of the "real world" of adult responsibilities, such as family, community, work, and continued learning. The major issue involved in developing an index of functional literacy is that, as a society, we do not have general agreement upon what knowledge everyone should possess, and different "real world" tasks demand knowledge, not simply some little understood set of content free "skills."

Deciding on just what the knowledge is that all of us should possess raises another problem. Who is to do the deciding about what is worth knowing? Many shudder at the thought that the federal government, or its contracted agents, might make this determination. Some think that private test development organizations have made this determination in constructing such important gate-keeping instruments as the Scholastic Aptitude Test or the high school equivalency exam. Still others think that business and industry have too much say about what people should be expected to know so that the United States can compete in the changing international marketplace. And the knowledge/skill issue surfaces when business and industry state that if the schools will simply teach the "basic skills," they (business and industry) will teach the knowledge people need for work.

Sometimes the conception of functional literacy centers not on the knowledge, skill, or information processing aspects of literacy, but rather on the instrumental value of literacy. Some regard that literacy as functional that leads to

the empowerment of the impoverished, disenfranchised people in our society. Yet others regard literacy as functional if it leads to a botter job, or improved parenting, etc. Usually, however, academic literacy that leads to satisfactory progression through the school system and into higher education is not considered as functional literacy, even though the instrumental value of education is readily apparent in our society. One might argue that if one is in the school system, then academic literacy is functional literacy. But if one is an out-of-school adult who is not pursuing an academic credential, then academic literacy is not functional literacy. In short, the person's context determines what literacy is functional and what is academic. The latter may be regarded as "nice to know" but not "need to know" for adults.

Confounding this issue of "academic" versus "functional" literacy is the empirical fact that if one repeatedly scores high on any number of standardized, academic tests of reading, writing, or arithmetic, one is much more likely to be able to perform a wide range of "real world" literacy tasks. It is likely this well-established finding that leads people to want to talk about literacy in terms of grade-school levels, and as content-free skills. A person who does consistently score at the twelfth grade level on standardized, nationally normed tests will, in fact, be likely to perform a wide range of literacy tasks, both in and out of school. This probably reflects the fact that most such tests sample a wide-range of knowledge domains and then select items that discriminate among people. People who know infrequently occurring vocabulary terms, for instance, are also likely to know more

frequently used words. In general, they are likely to have performed a much wider number and type of literacy tasks than people who score low on such tests.

Criticisms of the use of standardized, norm-referenced tests of literacy to indicate functional literacy result not so much from their findings with high scoring individuals or groups as with the results for individuals or groups who do not score so well. Then it may be argued that such tests do not accurately index how well these people can perform "real life" tasks, or that they possess specific literacy skills in targeted domains that meet their needs, and these domains are not well represented on the standardized, norm-referenced tests.

To Summarize Briefly. The issue of literacy as knowledge, skill, and information processing with the written language and other graphic tools of thought and communication underlies many of the problems in the assessment of literacy and functional literacy. Presently, the NAEP nor any other assessment systematically conceptualizes these different aspects of cognition, and uses this conceptual understanding to design and develop tests that can reveal the contributions of these different facets of ability to the performance of either academic or "real world" literacy tasks.

SOCIETAL DEMANDS FOR LITERACY

As noted above, Hunter and Harmon state that, while adults should have the right to self-determine their needs for literacy, they should also possess the ability

to meet the demands of society for literacy. But, as also noted above, it is precisely this point, that is, determining the demands of society, that produces the major controversies surrounding the assessment of literacy. Some will argue that the literacy demands identified are too low, and, therefore, some part of the population is being cheated by not having higher goals or standards set for it. Others will argue that literacy demands have been identified that are too high or inappropriate, and, therefore, some part of the population is being stigmatized as "functionally illiterate" and perhaps wrongfully being denied access to benefits such as education and jobs. We have witnessed the latter course of action repeatedly in the last decade as lawsuits brought against employers, including the federal government, for using "biased" tests for job selection and classification.

If societal demands for literacy are identified by an analysis of the types of "real world" materials and tasks that people will encounter in some contexts, it may then be argued by some that this is "domesticating literacy," that people are not being taught to go beyond the status quo and to liberate themselves from the clutches of contemporary power structures, but rather to acquiesce to and therefore, strengthen these structures that promote socioeconomic class differences.

Yet, if societal demands for literacy are not identified through some analysis of "real world" tasks and materials, then how can one determine that an individual or group possesses the ability to meet societal demands for literacy? And what if one of the societal demands identified is performance on the Scholastic Aptitude

Test to the level that one can gain admission to any college one desires to enter? Or that one can score on the Armed Forces Qualification Test above the minimum requirements established for access to military service, with its education, training, and medical benefits. Are such universally applicable gate-keeping devices to be considered as real-world literacy demands? They certainly determine the distribution of considerable benefits in contemporary society. And, all young men are subject to military service in times of emergency.

Functional Literacy as Aptitude. When one proposes to use an index of functional literacy as a diagnostic tool, so that we might determine if students are learning what the schools are teaching, a functional literacy index is considered as an index of achievement. However, if the assessment of functional literacy is meant to be diagnostic in the sense that it will predict who will or will not be able adequately to meet societies' demands for literacy now and in the future, then the index serves as an indicator of aptitude for future performance. In this case, what one would like to be able to say is that, if a person or group scores at a given level on the functional literacy index, then the probability that that person or group will be able to satisfactorily perform or learn to perform other literacy tasks is such and such. If it is the predictive value of a functional literacy index that is of greatest concern, then it is entirely possible that an assessment that focuses on responses to background questionnaires and other biographical information may provide a better index of functional literacy than a direct test of knowledge and skill. For instance, today the Department of Defense finds that whether a person is a high

school diploma graduate or not may be a better predictor of satisfactory adjustment to and performance in the Armed Forces than are the mental aptitude tests. Used in combination, the biographical data about high school graduation and mental test scores predict better than either alone.

Of course, the "aptitude" conception of functional literacy raises the same problems that are involved in establishing the predictive validity of any index. This surfaces the thorny issue of determining what should be the criterion or criteria to be predicted. Then, the problem of setting cut-off scores on the functional literacy index will arise, and so forth with all the problems attendant to selection and classification procedures. Yet, despite all these problems, it should be realized that any use of a test score or battery or profile of scores that asserts that a person who attains a given score or scores possesses "functional literacy" is implicitly committing to the aptitude conception of literacy, with all the benefits and drawbacks to aptitude assessments. This includes the predictive validity approach as the only established empirical method for evaluating the accuracy of the literacy-as-aptitude assessment.

It should be noted that with the use of item response theory (IRT), as in the recent assessment of adult literacy (Kirsch & Jungeblut, 1986), pools of items may be scaled such that one can estimate the probability that a person with a given scaled score can perform correctly other test items with known IRT scores. However, there is no knowledge of how well the person may perform or learn to perform tasks requiring literacy that have not been scaled. So while one may feel

confident that a person who scores at, say, the 280 level on the new NAEP adult literacy scale for prose comprehension has a fairly high probability of being able to perform well in reading novels, there is no way of being certain, for instance, that the person would work out well as a book reviewer for a newspaper. There is no scaled task for the latter in the present pool of scaled items. Furthermore, there is more to being a satisfactory book reviewer than merely being able to read and comprehend a prose passage. Perhaps what one might feel confident about is that if the person did not work out well as a book reviewer, it is not because of his or her inability to read and comprehend prose.

Functional Literacy as Achievement. The major problem with indexing functional literacy as a mark of achievement is that there is a lack of knowledge of the experiences and opportunities for learning that people have throughout the breadth and scope of the land and over their formative years. It is, therefore, not clear if lack of performance on a functional literacy index represents failure to achieve given the opportunity to learn what is being tested on the test, or a lack of knowledge, information processing, or skill in the latter due to some missed educational experience. As discussed earlier, and illustrated with quotes from the recent Stedman and Kaestle (1986) study, the distinction between achievement testing with or without the opportunity for learning what is being tested lies at the heart of many concerns with "bias" in testing. This is a particularly vexing issue when coupled with the literacy-as-aptitude use of a functional literacy index. That is because, while it is predictable that people who have achieved poorly in literacy

will have low aptitude for learning or performing in situations that demand well developed literacy ability, and they are in this respect functionally illiterate, it may be thought that a people's basic ability for learning, or "intelligence" is being insulted if they score poorly on tests for which they have not the opportunity to be prepared due to their particular background, and then those test results are used to screen people out of opportunities because of "low aptitude."

The latter point is not vacuous. It so happens today that the Armed Forces Qualification Test (AFQT) assesses vocabulary knowledge, paragraph comprehension, arithmetic word problem solving, and basic computational skill, two of the so-called "three R's," and these scores are used to screen people for entry into military service. They are referred to not as measures of literacy and mathematics achievement, but rather as measures of aptitude or trainability. The latter term hedges the distinction between achievement and aptitude to avoid the types of complaints of "bias" or lack of opportunity discussed above. After all, if the AFQT merely measured educational achievement, then the military might be charged seriously with the job of educating people to the point where they could qualify. On the other hand, if the tests are considered as aptitude tests, then there is enough suspicion that basic learning ability might be involved, and the military should not be held accountable for changing something that may have even biological bases, or so it could be argued.

The point of the foregoing is that it is difficult to develop an index of functional literacy that can be used diagnostically to say anything with much precision. Of

course, if tasks can be selected that most people will accept as being the kinds of things that most adults in the U.S. should be able to perform, and it is found that certain groups consistently perform well and others poorly, then, even if it is not certain just why that is the case, a focus for further, more diagnostic efforts has been achieved. But if this is the goal for NAEP, then it would seem that it has been achieved by any number of approaches. For the same findings regarding ethnic, minority, sex, and geographical differences in achievement have been obtained for the last 75 years of large-scale, national testing ranging from World War I to the present. Some problems have almost been diagnosed to death, since it seems that with more knowledge there has been less commitment of resources toward solving the problems. It is not clear to me how the development of yet another index of functional literacy will change this situation. But I hope it does.

References

Bormuth, J. (1975). Reading literacy: its definition and assessment. In: J. Carroll & J. Chall (Eds.) Toward a Literate Society. New York: McGraw-Hill, 62-83.

Cervero, R. (1985). Is a common definition of adult literacy possible? Adult Education Quarterly, 36, 50-54.

Fisher, D. (1978). Functional Literacy and the Schools. Washington, D.C.: U.S. Department of Health, Education, and Welfare.

Hunter, C. & Harmon, D. (1979). Adult Illiteracy in the United States. New York: McGraw-Hill.

Kirsch, I. & Guthrie, J. (1977-78). The concept and measurement of functional literacy. Reading Research Quarterly, 13, 485-507.

Kirsch, I. & Jungeblut, A. (1986). Literacy: Profile of America's Young Adults. Princeton, N.J.: Educational Testing Service.

Levine, K. (1982). Functional literacy: fond illusions and false economies. Harvard Educational Review, 52, 249-266.

Northcutt, N. (1973). The Adult Performance Level Study. Austin, Texas: The University of Texas at Austin.

Resnick, D. & Resnick, L. (1977). The nature of literacy: an historical review. Harvard Educational Review, 47, 370-385.

Stedman, L. & Kaestle, C. (1986). An Investigation of Crude Literacy, Reading Performance, and Functional Literacy in the United States, 1880-1980. Program Report 86-2. Madison, Wisconsin: University of Wisconsin-Madison.

Sticht, T. (1982). Evaluation of the "Reading Potential" Concept for Marginally Literate Adults. HumRRO FR-ETSD-82-2. Alexandria, Virginia: Human Resources Research Organization.

Valentine, T. (1986). Issues Central to the Definition of Adult Functional Literacy. Syracuse, N.Y.: Syracuse University.